LDWSF
4.8.2
9-20-12

Jorgensen Forge Outfall Site
EPA/Ecology/Jorgensen Forge/Boeing
2:00 – 5:00 PM
September 20, 2012

AGENDA

Introductions

Review of Outfalls Site Actions

- Phase 1 – Concrete/Clay Pipe Cleaning and Closure
- Phase 2 – Outfalls Soil Investigation
- Phase 3 – Corrugated Metal Pipe Removal and Outfalls Soil Contamination Remedy
    - Objective – Pipes and Contaminated Soil Removal
    - Jorgensen/Boeing Team Approach
    - Schedule Drivers – Sequencing With Other Projects
    - Administrative Process Proposal
    - Remedy Options Under Consideration

Next steps

- 3ϕ x 6ϕ FOOT AREA FOR CLEANUP; MATERIAL DIRECTLY BELOW PIPES
- 220 PPM @ CORNER OF PROPERTY
    * REMOVE CMP
    * " " SOIL TO WATER

PHASE III - NAME (OUTFALLS REMOVAL)
- JORGENSEN EECA (NORTH)
- UPLAND AREA (HWY)

BOEING
- ⊛ PROJECT START AUG '13
- ADMIN PROCESS TO BE DISCUSSED
- WORK PLAN
- OPTIONS OF WORK (NEXT COUPLE OF WEEKS)

JORGENSEN
- COMPLETE WORK AS SOON AS POSSIBLE

- RCRA OK w/ REMOVAL ASSESSMENT
- EECA STARTS WHEN ?? WANT TO COMPLETE PRIOR TO EECA
- EMAIL TO ECOLOGY TO PERFORM WORK.
- TRIBAL CONSULT ?

ACTION ITEMS:

① Boeing / Jony

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Boeing Plant 2 Facility

Sheetpile Wall (Boeing Property)

Outfall 9

Pipe Sealed at CMP and Clay Transition

Boeing 12-inch Property Line Pipe*

24-inch Property Line Pipe

Railroad Spur

JF01AR

JF01B

JF01C

009

Boeing DSOA

Jorgensen Forge Facility

Boeing - EMJ/Jorgensen Cleanup Boundary

NOTES:

1. The cleanup boundary between the adjacent Boeing and EMJ/Jorgensen remedies is the toe of riprap elevation. This elevation was surveyed by Boeing and EMJ/Jorgensen representatives during a low tide in August 2008.
2. Bathymetry surveyed by eTrac Engineering LLC (February 2012). Supplemented with bank survey by AEC (February 2012) and upland survey by PLS (January 2012).
3. The inactive 24-inch and 12-inch Boeing property line outfall were surveyed during a low tide in June 2012.
4. Outfall locations field identified on May 14, 2003.

*Formerly referred to as 15-inch pipe.

LEGEND:

- Property Line
- Fence Line
- 005 Inactive Outfall
- Monitoring Well
- Sample Location

Total PCBs (ppm)

- 0.5 - <1
- 1 - <5
- 5 - <10
- 10 - <50
- 50 - <100
- 100 - <200
- >200

0 20
Scale in Feet

DRAFT
FOR DISCUSSION PURPOSES - SUBJECT TO CHANGE

K:\Jobs\010128-JORGENSEN_FORGE\010128011\JFOS Phase 2 Geoprobe\PCB Extents.dwg Fig 1
Sep 20, 2012 10:24am chewett

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Figure X
Lateral Extents of PCB Contamination
Property Line Pipe Characterization
Jorgensen Forge Outfall Site

LDWSP 4.8.2 8-6-12

BOEING PLANT 2

2-66 Sheetpile

B-DGS1		
MLLW (ft)	BGS (ft)	Total PCBs
19.4 to 17.4	0 to 2	0.007 U
17.4 to 16.9	2 to 2.5	0.059
14.4 to 12.4	5 to 7	0.056 *
12.4 to 11.9	7 to 7.5	**1.08**
9.4 to 7.4	10 to 12	0.3 *

2-66-SP-05 (F/S Collected 11-18-11)		
MLLW (ft)	BGS (ft)	Total PCBs
19.4 to 17.4	0 to 2	0.0058 J
17.4 to 15.4	2 to 4	0.015
15.4 to 13.4	4 to 6	0.063
13.4 to 11.4	6 to 8	0.0077 J
11.4 to 9.4	8 to 10	0.012
9.4 to 7.4	10 to 12	0.6
6.4 to 4.4	13 to 15	0.019 UY

JF-DGP2		
MLLW (ft)	BGS (ft)	Total PCBs
17.6 to 15.6	0 to 2	0.277
12.6 to 11.1	5 to 6.5	**13.5**
7.6 to 5.8	10 to 11.8	**219 J**
2.6 to 0.6	15 to 17	0.402 J
0.6 to -1.4	17 to 19	0.0042
-1.4 to -2.2	19 to 19.8	0.0116 J
-2.4 to -4.4	20 to 22	0.12
-4.4 to -6.4	22 to 24	0.0046
-6.4 to -7.2	24 to 24.8	0.011
-7.4 to -9.4	25 to 27	0.35
-9.4 to -11.4	27 to 29	0.19

JF-DGP1		
MLLW (ft)	BGS (ft)	Total PCBs
18.3 to 16.6	0 to 1.7	0.166
14 to 12.2	4.3 to 6.1	0.58
9.6 to 7.9	8.7 to 10.4	**24.5**
5.3 to 3.6	13 to 14.7	**99**
1 to -0.8	17.3 to 19.1	**27.7**
-3.4 to -5.1	21.7 to 23.4	0.179
-5.1 to -6.8	23.4 to 25.1	0.0034 J
-7.7 to -9.4	26 to 27.7	0.0234

Transect 2 Boring 4 (Collected 1-13-11)		
MLLW (ft)	BGS (ft)	Total PCBs
16.3 to 14.3	2 to 4	**1.54**
0.3 to -1.7	18 to 20	**274**
-4.7 to -6.7	23 to 25	**72**

JF-DGP6		
MLLW (ft)	BGS (ft)	Total PCBs
8.6 to 6.6	10 to 12	0.282
6.6 to 4.6	12 to 14	**42**
3.6 to 1.6	15 to 17	**96**
1.6 to -0.4	17 to 19	**52.7**
-1.4 to -3.4	20 to 22	**13.2**
-3.4 to -5.4	22 to 24	0.089
-5.4 to -5.9	24 to 24.5	0.004
-6.4 to -8.4	25 to 27	0.92
-8.4 to -9.9	27 to 28.5	0.132

B-DGP1		
MLLW (ft)	BGS (ft)	Total PCBs
19.4 to 17.4	0 to 2	0.77
17.4 to 16.4	2 to 3	0.0145
14.4 to 12.4	5 to 7	0.0037 U
12.4 to 11.4	7 to 8	0.0038 U
9.4 to 7.4	10 to 12	0.0038 U
7.4 to 6.1	12 to 13.3	0.0038 U
4.4 to 2.4	15 to 17	0.0038 U

Transect 1 Boring 3 (Collected 1-14-11)		
MLLW (ft)	BGS (ft)	Total PCBs
17.4 to 15.4	2 to 4	0.07
11.4 to 9.4	8 to 10	**1.8**
1.4 to -0.6	18 to 20	**8.1**

JF-DGP3		
Feet MLLW	Feet BGS	Total PCBs ppm
18.6 to 16.6	0 to 2	0.09
16.6 to 15.6	2 to 3	0.0026 J
13.6 to 11.6	5 to 7	0.026
11.6 to 11.1	7 to 7.5	**300**
8.6 to 6.6	10 to 12	**359**
3.6 to 2.1	15 to 16.5	**12.3**
-1.4 to -2.4	20 to 21	**6.3**
-6.4 to -8.4	25 to 27	**3.29**
-8.4 to -10.4	27 to 29	**1.32**
-11.4 to -13.4	30 to 32	**3.06**

JF-DGS3		
MLLW (ft)	BGS (ft)	Total PCBs
13.8 to 11.8	5 to 7	0.0088J
8.8 to 6.8	10 to 12	0.0379 J
3.8 to 1.8	15 to 17	0.06 J
-1.2 to -3.2	20 to 22	0.05 J
-5.2 to -6	24 to 24.8	0.0038 UJ
-11.2 to -13.2	30 to 32	0.0036 UJ

JF-DGP5		
MLLW (ft)	BGS (ft)	Total PCBs
18.4 to 16.4	0 to 2	0.41
13.4 to 11.4	5 to 7	**1.9**
8.4 to 6.4	10 to 12	0.084 J
6.4 to 4.4	12 to 14	0.032 J
4.4 to 3.9	14 to 14.5	0.042 J
3.4 to 1.4	15 to 17	0.096
1.4 to -0.6	17 to 19	0.208
-0.6 to -1.4	19 to 19.8	0.67
-1.6 to -2.85	20 to 21.5	**1.3**
-6.6 to -8.6	25 to 27	0.77
-8.6 to -9.1	27 to 27.5	0.342

JF-DGP4		
MLLW (ft)	BGS (ft)	Total PCBs
18.5 to 16.5	0 to 2	0.104
16.5 to 15.5	2 to 3	0.0088 J
13.5 to 11.5	5 to 7	0.0237
11.5 to 9.75	7 to 8.75	0.164
8.5 to 6.5	10 to 12	0.93
6.5 to 4.75	12 to 13.75	**8.9**
3.5 to 1.5	15 to 17	**3.7**
1.5 to 1	17 to 17.5	**5.8**
-1.5 to -3.5	20 to 22	**2.49**
-3.5 to -5	22 to 23.5	**1.47**
-6.5 to -8.5	25 to 27	**1.92**
-8.5 to -10.5	27 to 29	0.29
-10.5 to -11	29 to 29.5	**1.2**
-11.5 to -13.5	30 to 32	0.64
-13.5 to -15.5	32 to 34	0.792

JF-DGS1		
MLLW (ft)	BGS	Total PCBs
13.94 to 11.94	5 to 7	**9.8**
8.94 to 6.94	10 to 12	**1.69**
3.94 to 1.94	15 to 17	0.046
1.94 to -0.1	17 to 19	0.0054
-1.06 to -3.06	20 to 22	0.38
-6.06 to -8.06	25 to 27	0.36
-11.06 to -13.06	30 to 32	0.0039 U

2-66-SP-10 (F/S Collected 11-18-11)		
MLLW (ft)	BGS (ft)	Total PCBs
19.4 to 14.4	0 to 5	**9.1**
14.4 to 9.4	5 to 10	0.16
9.4 to 4.4	10 to 15	0.0041

Transect 1 Boring 2 (Collected 1-14-11)		
MLLW (ft)	BGS (ft)	Total PCBs
17.4 to 15.4	2 to 4	0.0051
11.4 to 9.4	8 to 10	0.007
15.4 to 13.4	13 to 15	0.0039 U

Transect 2 Boring 2 (Collected 1-13-11)		
MLLW (ft)	BGS (ft)	Total PCBs
16.4 to 14.4	3 to 5	0.005
11.4 to 9.4	8 to 10	0.0049 U
6.4 to 4.4	13 to 15	0.004 U

Transect 2 Boring 3 (Collected 1-13-11)		
MLLW (ft)	BGS (ft)	Total PCBs
16.8 to 14.8	2 to 4	0.085
10.8 to 8.8	8 to 10	0.007
5.8 to 3.8	13 to 15	0.004

JF-DGS2		
MLLW (ft)	BGS (ft)	Total PCBs
13.8 to 11.8	5 to 7	0.0076
8.8 to 6.8	10 to 12	**1**
3.8 to 1.8	15 to 17	0.32
-1.2 to -3.2	20 to 22	0.0037 UJ

2-66-SP-01
2-66-SP-06
2-66-SP-02
2-66-SP-07
2-66-SP-03
2-66-SP-08
2-66-SP-09
2-66-SP-04
B-DGP1
T1B4
B-DGS1
2-66-SP-05
T1B3
JF-DGP2
JF-DGP3
JF-DGS1
12" CMP
2-66-SP-10
T1B2
T1B1
See note 4
JF-DGP1
JF-DGP4
T2B4
T2B3
24" CMP
T2B2
T2B1
JF-DGP6
JF-DGP5
JF-DGS2
JF-DGT1
JF-DGS3
T3B4
T3B3
T3B2
T3B1

2005 Video Survey Stopped Here Due to Hole in Pipe

JORGENSEN FORGE

Lower Duwamish Waterway

← Fence

- Phase 2 Primary Location (2012)
- Phase 2 Secondary Location (2012)
- Phase 2 Tertiary Location (2012)
- Phase 1 Investigation Locations (2011)
- 2-66 Investigation Locations (2011)
- Existing Monitoring Well Location
- 2-66 Sheetpile (Surveyed April 2011 by Hartman & Associates)

Notes:
1. Geoprobe Location JF-DGP1 was advanced at a 30-degree angle. The Phase 1 Investigation T2B4 location is the groundsurface expression of the angle boring and dashed pink line indicates the approximate terminus of the angle boring.
2. Orthoimagery provided by Floyd Snider based on aerial photography taken in July 2011.
3. Total PCBs are reported in milligrams per kilograms (mg/kg).
4. Pipes transition from vitrified clay to corrugated metal.
5. bold = Detection 1 mg/kg or greater
6. U = Not detected above reporting limits
7. J = Estimated value
8. MLLW = Mean Lower Low Water Elevation
9. BGS = Below Ground Surface
10. ft = Feet
11. PCB = Polychlorinated Biphenyl
12. * Floyd Snider Sample Result

Q:\Jobs\010128-01_Jorgensen_Duwamish\Maps\2012_05\PCB_Conc_Plan_View_7-3-12.mxd nkochie 8/6/2012 10:33:05 AM

FARALLON consulting
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Feet
0 12.5 25 37.5 50

Figure 2
Total PCB Results Plan View
Phase 2 Geoprobe Investigation Summary Report
Jorgensen Forge Outfall Site

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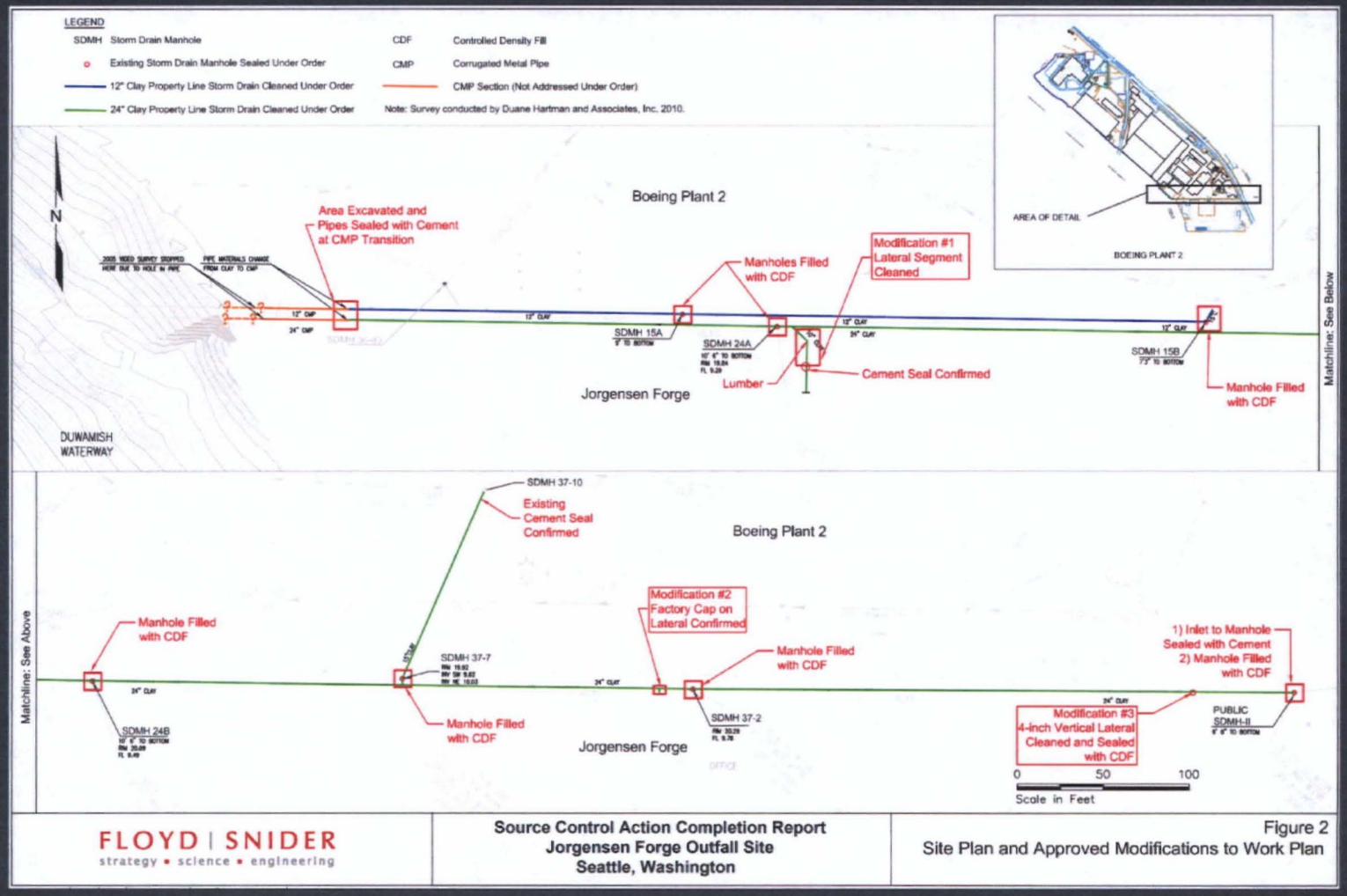
Jorgensen Forge Outfall Site
Summary of Phase 1 and Phase 2 Activities and Findings

Presented by
Tom Colligan, Floyd|Snider
Ryan Barth, Anchor QEA

September 20, 2012

Phase 1 – Cleaning and Closure Summary



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Source Control Action Completion Report
Jorgensen Forge Outfall Site
Seattle, Washington

Figure 2
Site Plan and Approved Modifications to Work Plan

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Phase 1 – Scope of Work Summary

- Clean and close 12-inch and 24-inch pipes and associated manholes
- Limited to vitrified clay section of pipes
- The Boeing Company (Boeing)/Jorgensen Forge added:
  - Tidal study
  - Investigation of soil along corrugated metal pipe (CMP) alignment
  - Collection of manhole solids samples within the pipes and laterals

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Phase 1 – Summary of Work Performed

- Cleaning and Sealing Recap (see figure for details)
  - Performed a pre-cleaning video survey
  - Blocked upstream flow from East Marginal Way
  - Sealed off tidal waters (at transition between CMP and clay)
  - Jetted solids from pipes
  - Sealed seven manholes with controlled density fill (CDF)

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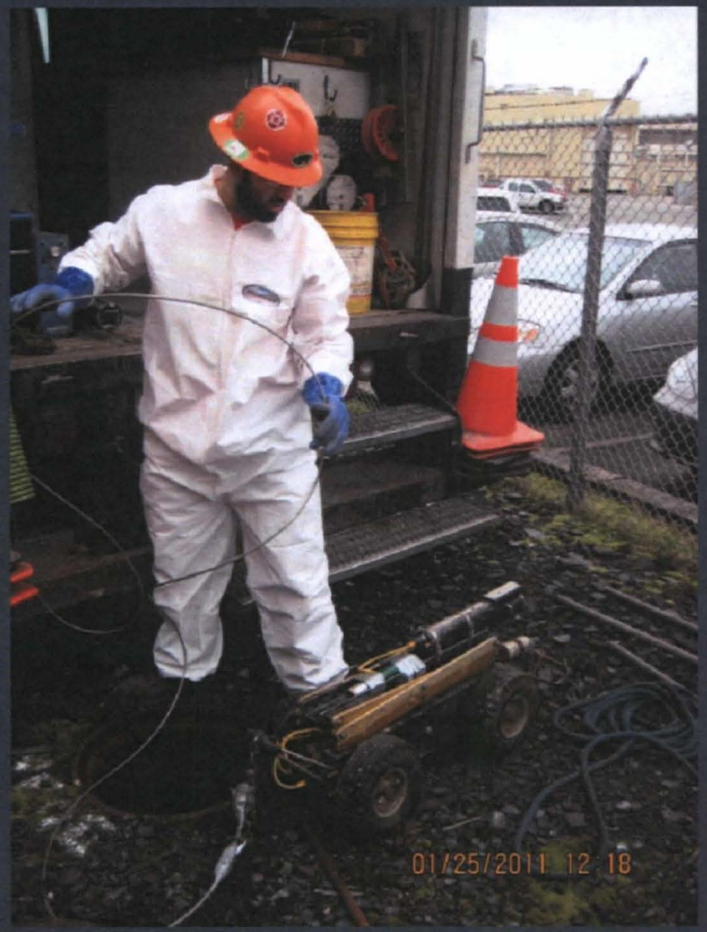
Phase 1 – Photos



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Phase 1 - Photos

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Phase 1 – CMP Investigation Borings

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Source Control Action Completion Report
Jorgensen Forge Outfall Site
Seattle, Washington

Figure 3
Geoprobe Boring Locations

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Phase 2 -- Scope of Work Objectives

1. Determine lateral/vertical extent of soil containing concentrations of PCBs above 1 ppm (preliminary screening level)
2. Perform chemical analysis to support soil removal action with respect to waste management/disposal suitability, worker safety, and sediment protectiveness
3. Evaluate the association between debris fill in the vicinity of the outfalls and possible PCB and other chemical occurrences

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Phase 2 – Summary of Work Performed

- 12 direct-push borings advanced from approximately 25 to 40 feet bgs
- Samples collected in continuous 2-foot intervals and submitted for PCB analysis using tiered approach
- Select samples submitted for metals, SVOC, and VOC analyses based on field observations

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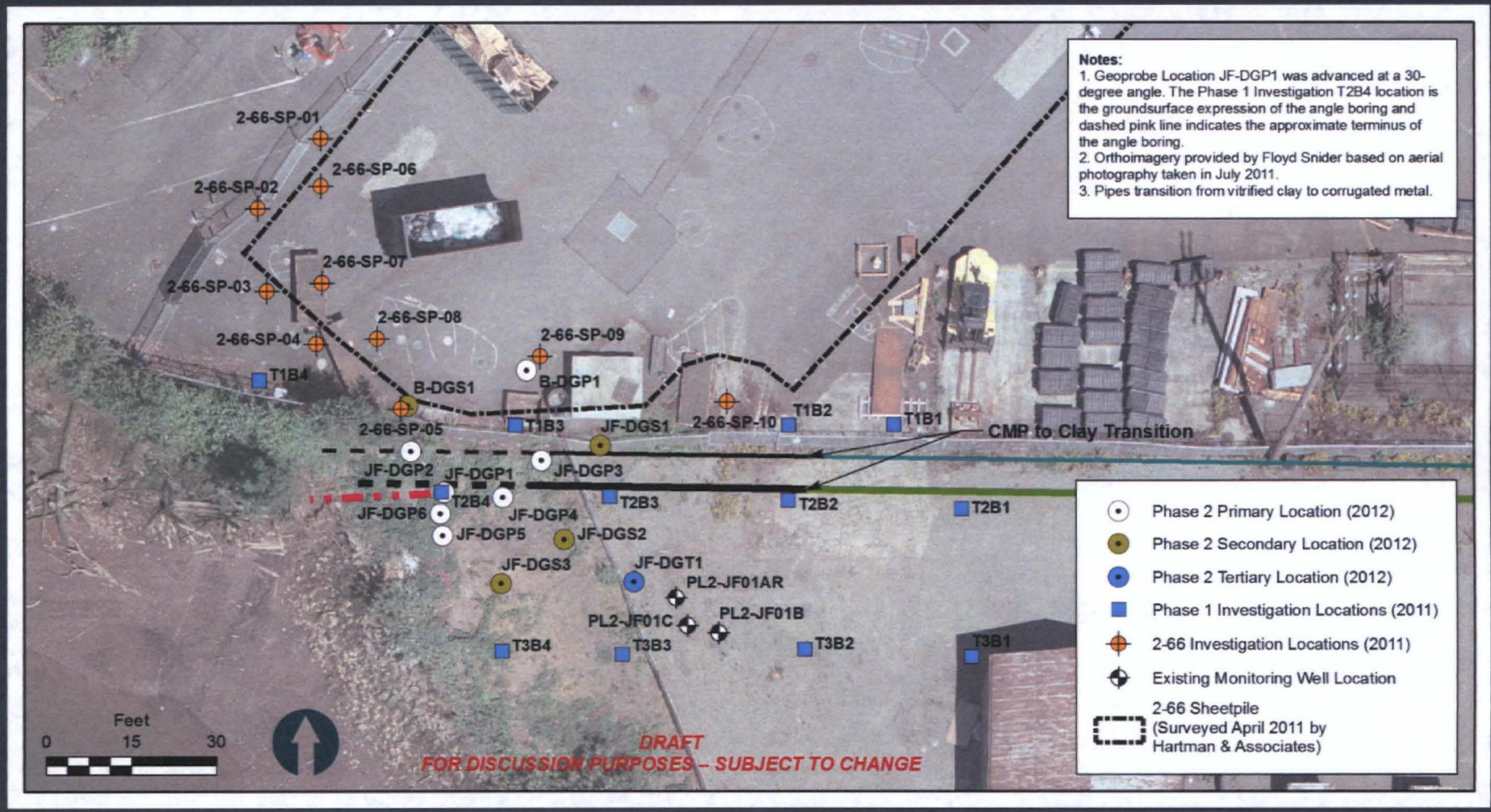
Phase 2 – Soil Investigation Locations



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Phase 2 – Photo

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Phase 2 – Soil Investigation Findings

1. Total PCB concentrations greater than 1 ppm were laterally/vertically bounded and limited to a very small area along CMP alignment
2. Sufficient data collected to support waste management/disposal suitability, worker safety, and sediment protectiveness evaluations
3. Debris fill is not a definitive indicator of an original source of PCBs and is indeterminate regarding metals

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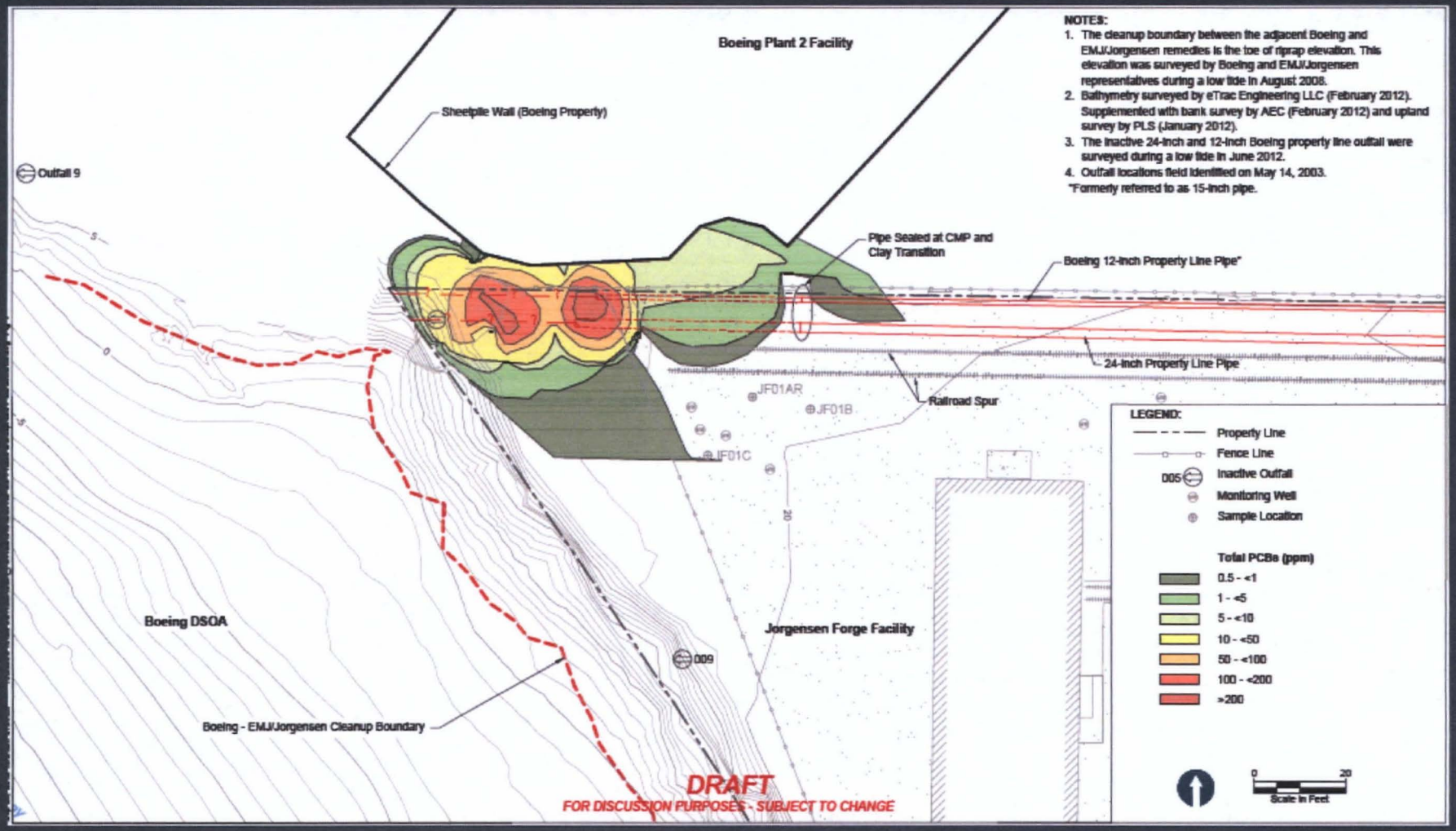
Phase 2 – Lateral Extents of Soil Impact



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